Patent claims

1. A method for actuating a thermostat (11), in particular in a cooling circuit of an internal combustion engine (1), wherein by means of the valves in the thermostat a small coolant circuit without cooler (2) and a large coolant circuit with cooler (2) can be disconnected from one another, connected to one another with closed-loop temperature control or can be connected to one another in a mixed operating mode with a mixing ratio with closed-loop temperature control,
wherein the activation units of the valves in the thermostat (11) are actuated by a logic element (logic) and the opening or closing times of the individual valves in the thermostat (11) are determined by a control algorithm which is implemented in the logic element (logic),
characterized in that the coolant temperature in the coolant circuit is adjusted to three different temperature levels as a function of the operating parameters of the internal combustion engine using the closed-loop control settings determined by the control algorithm, and in that the determined closed-loop control settings are retained for a predefined minimum period using a hold function.

2. The method as claimed in claim 1, characterized in that the operating parameters are obtained from the electronic engine controller, and in particular the characteristic variables for the quantity of fuel introduced into the combustion cylinder, the engine speed, the speed of the vehicle, the intake air temperature, the ambient temperature, the characteristic variable for the classification of the driver type or combinations of the aforesaid parameters are used for the calculation.

3. The method as claimed in one of claims 1 or 2, characterized in that the predefined minimum period is at least one hundred seconds.

4. The method as claimed in one of claims 1 to 3, characterized in that the three different temperature levels are 80°C, 90°C and 105°C.

5. The method as claimed in one of claims 2 to 4, characterized in that the closed-loop control settings are determined with a five-stage decision cascade.

6. The method as claimed in claim 5, characterized
- in that in the first stage (KE_ECT) of the decision cascade a first temperature setpoint value (TMSOLL1) of 105°C, 90°C or 80°C is determined from the engine speed (EngSpd) and the quantity of fuel (MAF, FJRATE) in the cylinders,
- in that in the second stage (ECT_FTK) of the decision cascade a second temperature setpoint value (TMSOLL2) of 105°C, 90°C or 80°C is determined from the first temperature setpoint value (TMSOLL1) and the characteristic variable for the classification (FTK) of the driver type,
- in that in the third stage (ECT_AT) of the decision cascade a third temperature setpoint value (TMSOLL23) of 105°C, 90°C or 80°C is determined from the second temperature setpoint value (TMSOLL2) and the intake air temperature,
- in that in the fourth stage (ECT_VehSpd) of the decision cascade a fourth temperature setpoint value (TMSOLL4) of 105°C, 90°C or 80°C is determined from the third temperature setpoint value (TMSOLL3) and the speed (Veh-Spd) of the vehicle,
- in that in the fifth stage (ECT_ExtAir) a fifth temperature setpoint value (TMSOLL5) of 105°C, 90°C or

80°C is determined from the fourth temperature setpoint value (TMSOLL4) and the external air temperature.

7. The method as claimed in one of claims 1 to 6, characterized in that when the internal combustion engine is subject to high loading the coolant temperature is adjusted to 80 or 90°Celsius as a function of the external temperature.

8. The method as claimed in one of claims 1 to 6, characterized in that when the external temperature is below minus 15°Celsius the coolant temperature is adjusted to 105°Celsius independently of the load,
- in that when the external temperature is in the range from minus 15°Celsius to 12°Celsius the coolant temperature is adjusted to 90°Celsius or 105°Celsius as a function of the load,
- in that when the external temperature is above 12°Celsius the coolant temperature is adjusted to 80°Celsius or 105°Celsius as a function of the load.

9. The method as claimed in one of claims 1 to 8, characterized in that when the intake air temperature is above 40°Celsius the coolant temperature is lowered.

10. The method as claimed in one of claims 1 to 8, characterized in that when the speed of the vehicle is above 120 kilometers per hour and the external temperature is above minus 15°Celsius the coolant temperature is lowered to 80°Celsius or 90°Celsius as a function of the ambient temperature.

11. The method as claimed in one of claims 1 to 8, characterized in that when the speed of the vehicle is above 160 kilometers per hour and the external temperature is above minus 15°Celsius the coolant temperature is lowered to 80°Celsius.

12. The method as claimed in one of claims 1 to 8, characterized in that the classification (FTK) of the driver type is taken into account in the lowering of the coolant temperature.

13. The method as claimed in one of claims 1 to 12, characterized in that when the control algorithm operates incorrectly the control algorithm is deactivated and the internal combustion engine is continuously cooled with maximum cooling power.